

- 51 -

ABSTRACT OF THE DISCLOSURE

An acoustic wave sensor utilizes one or more acoustic waves trapped in an acoustic wave cavity to detect the presence of one or more substances on a surface of the acoustic wave cavity. To detect the presence of ice, a trapped torsional acoustic wave is used. To detect water, an acoustic wave with flexural or compressional components is used. The sensor includes a number of transducers adjacent the acoustic wave cavity where a controller drives different sets of the transducers to generate different acoustic waves.